



AN ADDRESS

—DELIVERED BEFORE THE—

Piedmont Agricultural Society

—ON THE—

19th day of October, 1876,

—AT—

CULPEPPER, VIRGINIA.

—BY—

Hon. William Fullerton.

Published at the request of the Society.

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MR. PRESIDENT AND MEMBERS OF THE PIEDMONT AGRICULTURAL SOCIETY :

The production of the largest crops with the least labor and expense, is the great object to be attained by the cultivation of the soil. How to accomplish this is a question now agitating the whole agricultural world. It must be conceded that it has not been done in Virginia. That much of her lands are unproductive from bad cultivation admits of no denial. Her bare hills, the pestiferous broom sedge, meagre crops, fields abandoned to unsightly pines, the absence of grass and cattle, are unimpeachable witnesses that prove her agriculture defective.

I should hesitate to use this language, were it not that what I assert is candidly admitted and deplored by all her leading citizens. This ought not so to be. With her large territory, her easily-cultivated lands, her genial and salubrious climate, her energetic and intelligent people, her facilities for reaching good markets, Virginia ought to be one of the leading States in agricultural products, and her farmers among the most prosperous of her citizens. In order to become so, she has only to use her natural advantages, and restore to her soil that which an improvident agriculture has deprived it of.

It is but just to say, however, that this condition of things is not confined to Virginia alone. Wherever man has planted and reaped, the same ruinous consequences have followed. Lands naturally rich and productive have become infertile.

The whole of the Atlantic States, to a greater or less degree, are suffering from exhaustion. Though improvi-

dently cultivated, they once yielded bountiful harvests, but now fall far short of sustaining their population. Even the rich prairies of the West are rapidly deteriorating. The same wasteful method of cultivation is pursued there, and the same fatal results are in the near future. And even the Old World long since became alarmed by the discovery that while her population was rapidly increasing, the products of her soil, upon which it was to subsist, were as rapidly diminishing. A remedy was eagerly sought for.

Governments took the matter in hand ; the services of learned and scientific men were enlisted ; and during the past half century, there has been no question of political economy, in either hemisphere, upon which has been expended so much thought and labor.

And these labors have not been without good results. Nature has yielded up her secrets to the skill of man. The laboratory of the chemist has disclosed the laws which regulate and govern plant growth, and taught us how crops feed and grow, and upon what food they subsist.

The value of these discoveries to the human family can not be estimated. There never was a time when the tillers of the soil could prosecute their calling with so much intelligence and certainty of success, as the present. And if they do not hereafter find their labors better rewarded, it will be because they shut their eyes to the light that is afforded them. To be ignorant of these discoveries at the present day is to be without excuse.

Agricultural Colleges and stations, with their admirable systems of experiments, and agricultural journals, where there is such a valuable interchange of thought and experience upon all subjects connected with the cultivation of the soil ; and Agricultural Societies, where the results of different systems of cultivation are exhibited, afford opportunities for improvement which it is almost criminal to neglect.

There is no other calling in life in which there is manifested such an indifference to new discoveries, as is seen among the tillers of the soil. If a mechanic or manufacturer should in like manner fail to avail himself of improved implements or machinery, he would be compelled to relinquish his business. It is the farmer alone who resists anything new appertaining to his calling. This arises mainly from a deep-seated prejudice against what is called scientific or book farming.

A great majority of those engaged in cultivating the soil regard it as a mere muscular exercise, rather than a scientific pursuit; and they have regarded with indifference, if not with positive displeasure, every attempt to impart to it a scientific character. This is a serious error. Science is not learning. It is merely the interpretation of the laws of nature, and an unlettered man may do that. Indeed, some of the most valuable discoveries to the human race have been made by uneducated men.

He, who by intelligent experiment and observation increases the products of his land, and maintains its fertility, is a scientific farmer. And such a man has only to prosecute his work in the light of modern discoveries, to reap a rich reward for his labors. He will learn how the crops he cultivates feed and grow, and what is their respective appropriate food, and that providing the same nutriment for all kinds of crops is as unwise as it would be to feed the same kind of food to all animals.

But farmers as a general thing shrink from the study of agricultural chemistry, because they regard it as an occult science, requiring great research and investigation to comprehend it. So it does; but there are some elementary truths which lie at the foundation of the science, which every farmer can comprehend and apply to the cultivation of the soil.

It is not long since I saw a man making a compost of caustic lime with fresh barnyard manure. If he had under-

stood the chemical action of the lime, he would have known that the ammonia, the most valuable ingredient of the mixture, would be entirely dissipated by it, and the compost itself rendered almost worthless. He would also have known that if lime in another form—that of a sulphate—had been substituted, it would have preserved, instead of dispelling this same ingredient, and thereby added largely to the value of his mixture. It is a want of familiarity with these things, that renders them distasteful to the farmer. If he would make a few of the simple principles of chemical action his study, *and become familiar with them*, they would lose their mystery and he could profitably and safely apply them in his business. He does not hesitate to mix lime and sand together, when he has occasion to use mortar, and he sees and comprehends the chemical union which follows. He slakes his lime by pouring water upon it, and he witnesses the effects of that chemical law which causes it to heat, disintegrate, and fall into powder, fit for his use. He sees the housewife use yeast in making bread, and beholds the beautiful and useful results. These things are *familiar* to him from daily use, and the mystery which otherwise would envelope them has disappeared. He justly regards a knowledge of them as indispensable. But when you talk to him about the chemical laws which are involved in the growth of plants, how the soil becomes exhausted of their necessary food, and the means necessary to its restoration, he turns a deaf ear, and treats the subject as too intricate for his comprehension, and therefore one to which he should give little or no attention. Whereas there is nothing in all this that should deter him from investigation, but much that should induce it.

If there had been the same shrinking from the application of chemical laws in the arts, by unlettered men, the world would not have advanced where it now is. The article of soap in daily use in every household is manufactured by men who make no pretensions to a knowledge of

chemistry. They neither care nor need to know beyond the fact that the chemical combination of certain materials in given proportions produces the results which they seek to attain. The same thing may be said of the manufacture of gunpowder, that explosive material which requires such delicate manipulation, or of a score of other things which will readily occur to you all.

Indeed there is nothing in the laws governing the growth of plants any more intricate or difficult of comprehension than those which are involved in the manufacture of the articles named, or in making butter or cooking food, which is daily practiced in every household. I repeat, it is only necessary that farmers should *become familiar* with the laws which govern the growth of their crops, in order to dispel that mystery which deters them from availing themselves of their advantages.

I have spoken of the alarm which once prevailed lest the production of the earth, lessened as it was by reckless and wasteful tillage, would not keep pace with its rapidly-increasing population, and of the means adopted to discover a remedy. The result is, that to-day it is as well known what our crops extract from the earth, which tend to its exhaustion, and how fertility can be restored to it, as it is that light and heat are necessary to successful cultivation. And this knowledge, so dearly acquired, and so reluctantly accepted by those who could be most benefited by it, is absolutely indispensable to an intelligent and successful cultivation of the soil.

I do not mean to be understood as advocating the doctrine that the farmer should be able to explain the great mysteries of nature, or attempt to analyse her productions, as the chemist does ; but I do mean to assert, that he should know that his crops feed as his cattle do, each one requiring its appropriate food, and that when this food is exhausted from the soil, it must be restored *in kind*, or sterility will follow.

And now let me approach this subject a little nearer, and see what these discoveries are, and whether I over-estimate their importance.

Chemistry has determined with as much certainty what different materials enter into the composition of our crops, as the farmer can determine the different animals which are grazing in his fields. They are many in number, but I need mention only those which it is necessary we should restore to the soil in order to keep up its fertility, the earth as a general rule containing a sufficiency of all others. They are three in number, viz.: *Nitrogen*, *Potash*, and *Phosphoric Acid*. Without all of these, no crop can grow. That is, deprive the soil entirely of any *one* of them, and it is sterile. And crops are large or small just in proportion as the proper quantities of these materials exist in the soil. So that the farmer may be assured that when his land fails to produce a remunerative crop, it is deficient in one or more of the constituents I have named. It is not enough for him to know that his land is poor, and wants enriching; he should know what there is lacking in it to make it so. With the aid of chemistry, or what has been called book-learning, he can now know with as much certainty what quantities of these materials his corn or wheat have extracted from the soil, as he can to what extent he has exhausted his bank account, by the checks he has drawn upon it. For example, fifty bushels of corn to the acre extracts from each acre 64 pounds of nitrogen, 77 pounds of potash, and 31 pounds of phosphoric acid. Barnyard manure is valuable only as it contains more or less of these ingredients. It follows, if the farmer sells his crop of corn, then for every fifty bushels that leaves the farm there is taken just the amount of nitrogen, potash and phosphoric acid I have named. If, on the other hand, he feeds his corn up on the farm by fattening animals, then much of these materials are retained on it, and returned to the soil.

That only is carried off which goes in the carcasses of the animals sold.

It is seen by the example given that the exhaustion of the soil of these materials by a corn crop is not in equal quantities. Nor do any two crops exhaust the soil alike. This is an important fact for the farmer to know, for it enables him to see at once that when his land refuses to return a remunerative crop, it may be for the reason that only *one*, and not all, of these materials has been exhausted.

We often hear complaints made that the continued use of guano will in the end exhaust land, and for that reason it has been condemned by many. A moment's intelligent consideration reveals the cause of such a result. By constantly using guano in the cultivation of a crop which takes from the soil more of any one and less of the other two materials named than the guano supplies, you can see very plainly that the ingredient so disproportionately drawn upon will in the end be insufficient for the crop, when there would be a surplus of the others. Soil in this condition is unproductive for the lack of only *one* of the elements of plant food, and by the application of that one can be restored to productiveness. A knowledge of this simple fact leads to economy in farming. If land needs potash, it is a waste of time and money to apply bones or nitrogen.

This is very frequently the condition of land, and it is the reason why we so often hear complaints that superphosphate or bone meal had no effect. The material in such cases is pronounced spurious, and the vender condemned in unmeasured terms. Bones contain no potash, and superphosphate no nitrogen, and by adding either or both of these to land which is deficient only in potash is as wide of the mark as to offer corn to a well fed horse, when he is dying for water.

When we observe that no two crops which the farmer cultivates require the same amount of the different kinds of

plant food for their perfection, it opens a wide field for the exercise of intelligence and observation in managing a farm. If the farmer has raised a crop of wheat, he knows that the land has parted largely with its nitrogen and phosphates, and has retained a large per cent. of its potash. He sees at once that such land will produce a crop for which potash is the dominant manure, and where little of nitrogen or phosphoric acid is required; and so from time to time he will regulate his crops by an enlightened policy, and not by blind chance.

It follows that whatever is sold from the farm must, to a greater or less extent, diminish its fertility. Nature, on the other hand, renovates by her processes, instead of exhausting the earth. In forest and field, whatever grows in the soil is returned to it in the shape of leaf and branch. Whatever the air has contributed to vegetable growth is so much gain, and to that extent the soil is made richer instead of poorer. But the farmer cannot imitate nature in this respect. He must carry his products to the market away from the farm, and in this way there is a constant process of exhaustion which, unless compensated for in some way, will lead to ruin.

It therefore becomes a vitally important question for the farmer, whether he can restore to the soil what his products take from it, at a cost which will ensure a profit; and if so, by what means.

From what has been already said, it follows that there is no system of agriculture by which the farmer can keep his farm to the highest state of fertility, by the use of the manure he can make upon it. This has been demonstrated by all experience, and would seem to be a well settled, if not self-evident, proposition. Relying *solely* upon barn-yard manure is not a wise policy. Let us see what it contains. This, science has demonstrated for us.

Assuming that a cord of average barn yard manure weighs 3000 pounds (and that is about its average weight,)

it contains by actual tests 2456 pounds of water, 138 pounds of common sand, and 332 pounds of carbonaceous matter which is of no more value than common straw. There is left then only 74 pounds of active fertilizing material, possessing a money value. The loss in carting so much worthless material is apparent. The 74 pounds which is only valuable, could be carried by the farmer to the field in one hand, and applied in a few minutes. I do not mean by this to discourage the manufacture or use of barn yard manure. On the contrary, I would enjoin farmers to make more than they do, and to protect it with the greatest care from sun and rain before applying it. I am only trying to show that, inasmuch as the farmer must purchase outside materials for fertilization, that there is an advantage in getting them in a concentrated form so as to lessen the cost of hauling and application.

About the first resort of the farmer, heretofore, in order to supply this deficiency on the farm has been the purchase of Peruvian guano. When obtained pure, this is a most excellent fertilizer, but for reasons already stated it cannot be relied upon through a series of years for crops requiring a greater amount of certain portions of plant food than that which exists in the guano itself. The same ingredients it contains can be purchased separately in reliable form, and the farmer can compound them in such proportions as suit the different crops he cultivates. Bones will furnish him his phosphates, the nitrate of soda his nitrogen, and the Stassfurt salts his potash, and by a prudent and intelligent composition of these he can meet the wants of each crop he cultivates, and at the same time economise in their use by knowing the deficiencies of his soil.

It is in vain that the farmer seeks for a single manure which will meet the demands of all crops, for no such exists. In Virginia there is a great variety of soil. No two fields are alike in respect to their composition. They need different treatment, and the application of different materials

in different proportions, and he who expects to find any one thing that shall act equally well on all soils, is certain of disappointment.

This brings us to the subject of expense, and one of vast importance. In treating of expense I am aware I am encountering the prejudices of many who have purchased commercial fertilizers and applied them indiscriminately to lands without reference to their particular needs, thereby entailing a serious loss. I have already referred to this subject, and shown how the error was committed. Wisdom is gained by experience. And if any one who has suffered in this way will give the matter sufficient attention to comprehend it, he will see where his mistake was and remedy it. Science has done her part in making the way plain for him. It has furnished in the market all those elements out of which nature manufactures her products, and in the form in which she requires them. They can be had at a price which farmers can afford to pay. Whatever he lacks on the farm he can readily supply himself with, and his intelligence, the outgrowth of observation and experience, must do the rest. Of one thing he may rest assured that if he uses the means at his command, as he can and should, he can invest his money in fertilizers so as to reap large returns for the outlay.

No farmer can prosecute his business successfully on poor land, and there is no necessity for doing it, for any great length of time. It is a waste of time and money, of energy, and of life itself. It brings neither money to the pocket, nor joy to the heart. Farming is a very hard life unless it brings pleasure, aside from the profit. It is necessary for the farmers' enjoyment as it is for his pocket, that his land should produce what it is capable of when well fed and cultivated. And he can no more afford to raise less than that, than he can afford to pay his hired man full wages and require him to labor but a part of the time. The interest on the cost of his land is running whether the land

yields much or nothing, and the tax-gatherer must be satisfied though the garners may be empty.

Cultivating a farm without getting from it as large a result as the land is reasonably capable of producing, involves a useless loss. The difference between a crop of 80 and 20 bushels of corn to the acre, is the difference between success and failure. The expense of cultivating the larger crop is but little more than that of the other, while the cost of production of the smaller crop, compared with the result, is very much greater. Here, then, is the secret of the farmers' success or failure. Large crops within a small area should be his aim; and all his energies should be given to its accomplishment. If he has not sufficient manure to enrich twenty acres, let him put what he has upon ten. If the supply is insufficient for ten then reduce the area to five. *At all events whatever space he cultivates let him enrich it and raise a maximum crop.*

I know what some of you may say, that in consequence of the lack of means, I am recommending impossibilities. I respectfully, yet earnestly deny the soundness of any such proposition. There are very few farmers so limited in their means that they cannot at once enter upon the system of cultivation which I shall point out, and which will as certainly result to their benefit as that seed time and harvest shall continue. I venture to lay down this proposition as indisputable, that there are farmers who entertain the idea that they cannot afford to buy fertilizers, who waste enough each year in unwise tillage to supply themselves with them. I have seen such cultivate a large area of poor land at an expense which would have enabled them to fertilize and cultivate one-half of such area so as to make it produce as much as did the whole. And this diminished area could not only have been made to produce as much as twice its extent in acres, but it would be left after the crop was removed in a condition which with a proper rotation would cause it to increase, and not to diminish in its fertility.

The amount annually lost in this State from too large farms, and the cultivation of too great a surface without remunerative returns, and the sale of whatever is so produced from the farms, without any return to the soil of the elements removed by the crops, is something alarming to contemplate. Such a reckless system would impoverish any land, however productive in its natural condition. And when I recommend the purchase of fertilizers, in order to insure large crops, it is not with a view of encouraging that system of tillage which removes everything from the farm which is produced upon it. Nothing but a truck farm, where vegetables are raised for city consumption, could warrant the expense of such husbandry.

The necessary steps towards an improved husbandry in this State are :

1. To cultivate less land.
2. To make that which is cultivated rich in plant food, so that it may produce large crops.
3. The practice of a rigid system of rotation of crops, and mixed farming.
4. The cultivation of the grasses and less of the cereals, and feeding upon the farm the most of its products.
5. Raising clover and enriching the land by turning under green crops.

I speak earnestly and sincerely when I say that I believe that the faithful practice of such a system of tillage would in ten years increase the value of real estate in Virginia 100 per cent., and place the farming population in an independent condition. There is nothing new in these suggestions. They are the same old, old story, oft repeated and often disregarded. They, nevertheless, employ the true policy for tillage, and the time will come when they will be universally adopted.

The advantage in small farms can scarcely be over estimated. France is an eminent example of this, and she is to-day the wonder of the world. With a territory not

equal to one-fifteenth of our States, and but little greater than Texas, she raises nearly double the wheat produced by the United States, and besides supporting a population of nearly forty millions, her exports the last year exceeded our own. This all arises out of the fact that her farms average less than sixty acres, and are made to produce to the full extent of their capacity.

All observation and experience go to show that those sections of the country are most prosperous where a mixed system of farming prevails. Not only a nation, but a farm should be as near self supporting as possible; and that mode of cultivation which comes nearest to accomplishing that object ensures the largest measure of success.

The farmer who finds in his own garner that which is needed to supply his daily wants is far removed from the vexations and losses attendant upon outside purchases which so severely tax his means. It is not unfrequently the case, when he produces but a single article for the market, that it commands a price which but poorly compensates him for his labor, while he has to pay exorbitant prices for that which he is compelled to purchase. This is "selling the *hide* for a penny, and buying back the *tail* for a shilling," which surely is not a profitable transaction.

Mixed agriculture necessarily leads to a system of rotation of crops which is the key to successful farming. That there is a vast recuperative power in lands where a succession of different crops is grown no one can deny in the light of universal experience. Thousands of those who have hitherto devoted themselves to a single production, such as cotton, tobacco, or grain, now acknowledge their error.

Successive crops of the same character exhaust lands of the particular food they require, with great rapidity. The aid which nature so freely renders where crops rotate, is withheld in such a system of cultivation, because the farmer is violating her laws. To fight against nature is to war at fearful odds, and it is not difficult to forecast the result. To

work in harmony with her, ensures a comparatively easy victory. One of the most beautiful of her provisions is that while one crop exhausts the soil of that element which enters most largely into its composition, by the operation of some mysterious law, *it prepares that same soil for some other crop of a different character.* This is a very curious and interesting process of nature, which results immensely to our advantage if we accept her aid. As an illustration of this principle, we know that clover does not successfully follow itself, although it leaves the ground in the best possible condition for corn or wheat. One crop therefore restores in a measure what another has taken. By raising continuously the same plant you interfere with this beautiful contrivance of nature to rebuild her wasted strength. How this is done is imperfectly understood. We do know, however, that the deep-rooted plants, like clover, will pump from the depths below for the use of those that grow near the surface that food which has been carried beyond their reach. And not only that, this element when thus brought to the surface acts chemically upon what it finds there, and renders soluble and available as plant food, what before was inert, and resisted assimilation.

Nature, therefore, will do much of our work for us if we will only second her efforts, and give full scope to her beneficent laws. It is, therefore, a question for the farmer to determine whether he will, by a rotation of crops, have his soil enriched by drafts on nature's treasury, or draw entirely upon his own.

I do not mean to argue that there is nothing for the farmer to do but follow this system of rotation to make his lands productive. Far from it. But I do argue that he may make nature a co-worker with him in attaining a most desirable end. Change is a prominent feature in nature's economy. Cut down the forest of hard wood and the pines succeed. Again, remove the pines and the hard wood reappears. One kind of grass succeeds another and nature

supplies the seed. These changes give the soil rest, to the end that the process of reinvigoration may go on. Day and night succeed each other, and each performs its particular function in promoting vegetable life. Eternal sunshine would result in eternal blight. The falling dew brings with it the nitrogen from the air to gladden vegetation. The sun appears. Its light and heat liberate the acids and gases which enter upon their work of usefulness in preparing a variety of vegetable food.

Winter and Summer follow each other. Frost disintegrates and renders the earth porous, opening the way for the heat and moisture of Summer, so that chemical laws may work out their beautiful results.

Thus unceasingly, year after year, the silent agencies are at work preparing the earth for man's use, that it may bring forth abundantly of everything which was designed by a beneficent Creator for his support.

There can be no rational or successful rotation of crops, unless grass, including clover (and for all present purposes I shall treat clover as one of the grasses) holds a conspicuous place. *The great need of Virginia, to-day, is grass.* It is the great source of the world's wealth. I do not overrate its value as estimated at the present, or in ancient times.

In issuing the command which brought vegetable life into existence grass was first enumerated.

"And God said let the earth bring forth *grass*, the herb yielding seed and the fruit tree yielding fruit after its kind."

"And the earth brought forth *grass*, and God saw that it was good."

This was before the creation of man or beast, and was designed to fit the earth for both.

Named first in the order of creation it stands among the first in importance to the human family. All history shows that no nation was ever agriculturally prosperous, that did

not make it one of its chief products. Raising grass necessarily involves raising cattle, and you can measure the prosperity of any nation by the number of cattle within its borders. That kind of husbandry takes less from the soil than any other, and requires less labor to prosecute it.

A practical Southern writer, in speaking of the high price of lands in the North as compared with those in the South, uses this forcible language :

“Why this difference? Is the land in these countries “better than ours? Not by nature—if it be better it is by “the difference of treatment. Is their climate better than “ours? The acknowledged superiority is on our side. Are “the prices of their products any better than ours? On an “average not so good. Are their taxes lighter than ours? “If we were compelled to pay their tax, either at the North “or in England our land would be at once sold for taxes. “Have they valuable crops, which they can raise, and “which we cannot raise? There is not a farm product in “either Old or New England which we cannot raise in equal “perfection at the South. Is their labor cheaper than ours? “The cost of labor at the North nearly doubles the cost of “labor at the South. In England labor is cheaper than “with us. But the difference is, perhaps, compensated by “the poor and church rates, and other excessive taxes paid “by the English farmer.”

“If, then, our climate is as good as that of the countries “referred to, if our land is as good as theirs, if our products “bring as good prices, if our taxes are much lighter, if we “can grow all the crops that they grow, if labor is cheaper “with us than it is at the North, and if difference in taxes “compensates for the cheapness of labor in England, why “is it that their land is so valuable, and ours so valueless?”

“We shall find the map of use to us in answering this “question. If we take the map of the United States, and “put our finger upon the States or parts of States in which “land sells at the highest price, we shall find that in those

"States or parts of States the greatest attention is paid to
 "the cultivation of the grasses and forage plants. If we
 "open the map of Europe we shall find the same rule holds
 "good. The cheapest lands in Europe are those of Spain,
 "where little attention is paid to grasses. The value of
 "lands rises exactly in proportion to the attention which is
 "given to them ; in England and Holland reaching some-
 "times, for farming purposes, to \$1,000 per acre. Holland
 "is almost a continuous meadow. This land value culmi-
 "nates in Lombardy, where irrigated meadow lands *rent*
 "for \$60 to \$100 per acre. Without exception, in Europe
 "and America, where a large portion of land is in grass or
 "forage crops, the price of land is high, reaching the figures
 "above mentioned. On the other hand, without exception,
 "wherever in either continent the grasses do not receive this
 "attention, landed estate is of comparatively low value."

"Now when in the investigation of the cause of a given
 "effect, we find in a number of instances in which the result
 "occurs, the presence uniformly of a particular agent, and
 "in a number of similar instances in which the result does
 "not occur we find this agent to be absent ; then unless
 "good reasons to the contrary be given, we are at liberty
 "to attribute the result to the presence of this agent. The
 "conclusion is irresistible that a large attention to the cul-
 "tivated grasses is essential not only to improved agricul-
 "ture, but also to a high value of landed estate. If there
 "be a flaw in this reasoning the writer has been unable to
 "detect it. Fifteen years ago this solution was offered of
 "the apparently anomalous condition of our lands, so
 "favored as to all the elements of agriculture and yet so
 "ruinously low in saleable value. Time has but strength-
 "ened the conviction of its correctness. The argument is
 "strengthened by the consideration that extended grass
 "culture in any country is an index of the existence of an
 "improved agriculture. Where this occurs there must be
 "large numbers of horses or mules, sheep and cattle. These

“produce an abundance of manure. Where there is an abundance of manure there will be large crops. Where there are large crops land will be valuable. These results follow from the grass crop as the first cause.”

The abundance and superior quality of the grasses which abound in some parts of this country has given rise recently to a new branch of trade which is not without significance. Weekly shipments of beef are now made to Europe from this country. The experiment seems to have been entirely successful, and it is thought that it is the beginning of a permanent and profitable trade, which may be increased to any extent. The meat thus shipped brings the highest market price—for it is equal to the best in the English market and far surpasses the most of it. Living as you do so near to the points of shipment you may be interested in knowing what the English papers think of this new enterprise. You may be sure that if anything favorable is said of it by them, that it is deserved.

In the October number of the *Southern Planter and Farmer*, I find the following extract from the *Agricultural Gazette* of London :

“The success of the system is established, and, the trade being consolidated, we may anticipate receiving importations that will have a sensible effect upon our meat supplies, and consequent reduction in the present exorbitant high prices of all descriptions of meat. The quality of the meat of the grass-fed American bullocks is described as equal to the finest Aberdeen beef; and when its ripe condition from long suspension in a dry atmosphere at a uniform temperature of 38° becomes known, we may anticipate a rivalry between the purveyors of the Clubs and the hard working artisans, in the race to obtain the American beef. The important question for the English feeder to consider is, how is this obtrusive competitor to be met on the retail butcher’s stall? Alas! the day is gone when the British farmer boasted of the high quality

“of his meat. The injudicious use of substances rich in
 “non-nitrogenous elements has injured the character and
 “deteriorated the quality of his beef and mutton. A com-
 “plaint arises from every householder, that meat at the
 “present time is too fat ; that nature’s proportion of lean
 “and fat is disturbed, greatly to the disadvantage of the
 “consumer. The production of an enormous fat beast or
 “sheep is no indication of the intellect or skill of the ex-
 “hibitor. Give to a well bred animal an abundance of
 “substances rich in non-nitrogenous or fat-forming elements
 “and fat, and fat only is produced. Let the physiological
 “truth be admitted, that flesh is formed only from the
 “nitrogen existing in all vegetables, and the sensible feeder
 “anxious to produce well proportioned meat, will use with
 “judgement and not indiscriminately, the refuse of the ex-
 “pressed oily seeds.* The American feeders probably could
 “never have invaded the English meat market at a more
 “opportune period. The shambles are sparsely covered,
 “and the quality of the meat exhibited is, generally speak-
 “ing unpopular and ill adapted to cope with the grass-fed
 “meat that they are prepared to offer.”

This means that good quality of beef that is raised near the sea-board, because animals that have been subject to the hardships and privations of transportation from distant points to the point of shipment, are not in a condition for exportation. I have been told by one of the largest cattle dealers in this country that animals fattened near the markets where they are slaughtered, always bring higher prices for that reason, than those brought from a distance.

It is not difficult to see that Virginia, in consequence of her admirable location, her superior winter climate, the adaptation of her soil to raising those grasses which produce the finest qualities of meat, is in a condition to profit very largely, by this new industry, if she puts herself in a condition to take advantage of it. And if she will get her lands in grass, introduce a prudent system of rotation of crops,

using the plow only to renew her grass lands when it is necessary, discontinue the raising of wheat except for home consumption, and raise corn only to be fed to her cattle, she can compete with the world in supplying the home and foreign markets with meat.

It may be regarded as a maxim in farming, that, that system is most desirable, which enables the farmer to produce, the largest amount in value at the least expense, and at the same time keep up the fertility of his soil. The cultivation of grass and feeding cattle for the market will better enable the farmer to accomplish this than the prosecution of any other business. It does away to a great extent with the plow, the excessive use of which has been the curse of your state, and reduces the expenses of labor to the minimum amount.

But I must speak more particularly of clover. It is called and properly so "the sheet anchor of American husbandry." Too much cannot be said in its praise. It is capable of doing more to bring your impoverished lands to a high state of cultivation with less expense than any one other agency. Its universal use as a restoring crop, would in a few years make Virginia as celebrated for her agriculture as she has ever been for her statesmen. And just in proportion as the farmer cultivates this plant will he be relieved from the necessity of purchasing commercial fertilizers to enrich his land. Whilst there is no system of cultivation which will enable the farmer to keep up the fertility of his land without resorting to such agencies, yet the use of clover will go very far towards accomplishing it.

A writer in one of the prominent farm journals in speaking of clover says :

"A few pounds of diminutive seed furnish machinery
 "to absorb from the atmosphere and pump out of the earth
 "the elements of fertility needed to replace what our waste-
 "ful and improvident predecessors have expended. I
 "solemnly believe that in the benign providence of God,

“clover is to be the Moses which is to deliver Southern Agriculturists from the bondage of poverty and debt by “restoring our wasted and worn inheritance to its original “fertility.”

This language is not too strong. Clover does for the land what no other plant can. It is like the gleaner of old, it gathers up and makes useful what is lost.

Nitrogen in the form of nitric acid, one of the most important and expensive elements, which enter into the growth of our crops, descends by the action of rains, so far into the soil as to be beyond the reach of ordinary plants. The roots of the clover plant are so many messengers to bring it back to the surface again.

The coral insect does not more effectually extract from the waters of the sea the material which enables it to construct the wrecking reef than does the clover plant seek out and garner plant food from earth and air for man's use. And then as if to indicate what great office it was designed to perform in the economy of nature viz:—to prepare the way for other life, it refuses to consume this ingathered nutriment, but dies and leaves it for the nourishment of succeeding crops. It is this fact that has led farmers to say that their lands, where clover had grown in great luxuriance, but refused to grow longer, was *clover sick*. In other words it had performed its function, accomplished the great object of its life, and then like the silk worm, died.

There is nothing truer in nature, than that the clover plant whilst drawing largely upon the richness of the soil for its own sustenance, leaves the earth far richer in plant food than it found it. And this marvelous feat is by a skill peculiarly its own, for the wit of man has never accomplished it. Science has for years been engaged in trying to discover some inexpensive method by which the nitrogen of the air could be forced into combination with other substances so as to be used in cultivating the earth. It has never been accomplished. That it will be I do not

doubt, for it would be a bold man who would set a limit to man's discoveries. He that is successful in this field of experiment, will be the world's benefactor, for he will have bestowed upon it a priceless boon. But what man has failed to do, the clover plant is constantly accomplishing. In your fields, where it is grown, this great helpmeet, is silently but successfully toiling for your good. Earth and air yield alike to its influence and surrender their riches to its solicitations.

If then clover is the Moses to lead you out of the wilderness (and I agree with the writer from whom I have quoted this language) I beg of you let the figure drop there, and do not let it be forty years in accomplishing it. The promised land can be reached in a much shorter period. Pisgah will rise up at your bidding, the waters will divide to your approach, and you can pass over from leanness to plenty. Clover will do for you what miracles did for Moses. Yea it will do more. It will cancel notes, pay mortgages, extinguish obligations and bring abundance where there is now want.

And now having condemned that system, which permits what is raised on the farm, to be sold from it, I beg leave to suggest other modes of getting an income from your labor. In doing so I must call attention to some facts which need no comment. You have easy and daily access to the Cities of Alexandria, Washington and Baltimore, where there is found a ready market for everything your soil is capable of producing. *And yet the two former cities are supplied daily with the most of the cream which is used for domestic purposes, from distant counties in the State of New York.* And when you request the purchasers to take their supply from Virginia, they will do so only at a reduced price, for the alleged reason, *that for the want of good pasture we cannot produce so good an article.* They think—and with some cause—that broom sedge will not make good cream. It is for this cause that our home markets are closed against us,

and we are shut out from an industry that has made my native State rich.

Washington has also received the most of her supply of *hay* from the same source, and her *best butter* from New York and Philadelphia. This is a reflection upon our soil, which, though now deserved, it is needless to say will not long be submitted to. For it is capable of growing grasses as sweet as ever sprang from the earth, and in quantities to satisfy the most exacting. It follows that the aroma of our butter and cream may be such as to tickle the palate of the most fastidious. I sincerely trust that the day is not far distant when the order of things will be reversed, *and the place of demand and supply respectively changed*.

Neither does Virginia manufacture the cheese she consumes, an industry which has enriched a great portion of the North, and for which the most of your State is well adapted.

Your short winters, and the consequent advantage you possess in fattening cattle and sheep for the market at a diminished expense, suggests a branch of business which other sections of the country, less favored than you, have made profitable. So far as these things are concerned, you should fear no rivalry. Corn, one of the most important crops in our country as a fat-producing food, finds a congenial soil in Virginia. Boast as they may of the products of the Western prairies, your lands will produce as much per acre as theirs under that treatment which you ought to give them.

Virginia is a favored State, and I can foresee a great future for her. There is a spirit of inquiry among her people which will bear good fruit. One of the most cheering indications of her improvement is, that there is now published within her borders one of the best agricultural papers in this or any other country. Each number is worth ten times the year's subscription to any one engaged in agriculture. As a matter of self-improvement, as well as

State pride, it should be read in every farmer's household within the State. I refer to "The Southern Planter and Farmer," published in Richmond. If it does not radically change the defective agriculture of this State, it will be because its wise counsels are not heeded.

There is much at the present time to encourage the farmer, for the outlook for our agriculture was never more favorable. The Old World is not self-sustaining so far as bread and meat are concerned, and the deficiency in those essentials is constantly increasing. The demand made at the present time for our breadstuffs is very large. And in view of the constantly-increasing population abroad, no one can doubt but that those demands will increase rather than diminish. A constant future demand seems therefore to be ensured, which must necessarily affect the price for farm products. It is true that we are annually bringing extensive tracts of "virgin" soil under cultivation, thereby adding largely to the products of the country; but it is equally true that lands already under cultivation are producing less every year from wasteful culture, and our own population is rapidly increasing, so as to require a larger amount for home consumption. The increased product will not more than keep pace with the increased demand. And had it not been for the partial restoration of the exhausted lands of Europe by the use of bones and guano, our country with all its vast resources would have been taxed to its uttermost to supply the foreign demand. Everything indicates a bright future for the farmer, and if the soil from which he must derive all of his wealth is the object of a wise care, his success would seem to be assured.

If I am not trespassing too much on your patience, there is another subject upon which I should like to say a few words. In the October number of the "Planter and Farmer" a correspondent writes as follows: "There is a topic which cannot be too earnestly brought home to farmers. I mean this. THEIR PROFESSION MUST BE MADE

“MORE ATTRACTIVE. EVERY YOUNG MAN WHO CAN GET A
 “BEGGARLY CLERKSHIP IN TOWN IS QUITTING THE COUNTRY,
 “AND FARMING IS TREATED WITH CONTEMPT. IS THERE NO
 “CURE FOR THIS ?”

The last census shows that this is the case to a very great extent throughout the rural districts generally. It is an evil which challenges serious attention. Virginia may be said to be an agricultural and not a manufacturing State. Her strength, therefore, lies in the products of her soil. By the withdrawal of her young men from its cultivation, she is weakened in a vital point. Goldsmith deplored this evil. In his “Deserted Village,” he immortalized a great truth by saying :

“Ill fares the land, to hastening ills a prey,
 “Where wealth accumulates, and men decay.
 “Princes and lords may flourish or may fade ;
 “A breath can make them, as a breath hath made.
 “*But a bold peasantry, their country's pride,*
 “*When once destroyed, can never be supplied.*”

The future glory and prosperity of Virginia depends more upon the character of the men who shall cultivate her soil, than those who shall draw salaries from her treasury. Put intelligence upon the farm, and you will have distinction in the cabinet. A successful scientific agriculture infuses life and health in the whole body politic, and strengthens the arm of the State. Young men can make no more fatal mistake, than to look upon farm labor as degrading. To till the soil is as honorable as well as a useful employment. The first command of the Almighty, after the creation of man, was, that he should “subdue” the earth. That command afterwards received its practical fulfilment when Adam was placed in the Garden of Eden with the Divine injunction “to dress and keep it.” And as if this were not enough to dignify and ennoble the labor of the husbandman, we are told by the sacred historian that whilst “the heavens, earth and sea” were called into

existence by a simple command, yet that "*The Lord planted the Garden* which Adam was commanded 'to dress and keep.' " The necessity for toil, therefore is not, as has been so often alleged, a part of the curse, consequent upon the fall, for these events to which I allude, were before the great transgression. The necessity for labor should therefore be regarded as a blessing. The Psalmist, in enumerating the evidences of God's goodness and wisdom, exclaims, "Man goeth forth unto his work and to his labor until the evening." Labor, therefore, should not be treated with contempt. Neither should farming be made so unattractive and repulsive as to drive young men to the large towns and cities to seek precarious livelihoods there. Is the country to lose not only their presence, but also their energies, their talents, and the benefit of their example? A remedy may be found for all this. Young men can and must be attracted to country life. That remedy is in the hands of the present generation. It is to make farming more attractive by making it more profitable and less laborious. If instead of fields covered with broom sedge, and scarred by deep, cavernous and unsightly gullies, capable of producing, under the treatment they receive, barely sufficient to pay the expense of cultivation, your sons could look upon rich, well-cultivated and productive farms, adorned with herds of well-bred cattle, barns bursting with the rich fruits of the harvest, they would cease to sigh for city life and adventure. They then could see something ahead in their lives beside unrecompensed toil and griping poverty. I do not say they could accumulate great wealth, but I do affirm that they could surround themselves with the comforts and luxuries of life sufficient for a rational enjoyment.

What we want on the farm is that energy and enterprise which makes the successful merchant, that talent which makes the successful professional man, and that educated observation which enables men to unlock the secrets of

nature, comprehend her laws, and appropriate her wealth. No other calling opens a wider field for investigation or a grander opportunity for useful experiment, which may benefit not only the individual, but all mankind.

It is desirable to accumulate wealth, but it is still better to be useful. It is our privilege to be rich, whilst it is our duty to be useful to our fellow men. It is a hackneyed saying, that he who makes two blades of grass grow where but one grew before, is a public benefactor; and it is true. It illustrates that great want that everywhere exists for progress in the cultivation of the earth, and the willingness of the world to honor those who contribute to it.

Who deserves to be more honored than he who first discovered the constituent elements of vegetable life, or Lawes and Gilbert of England, Ville of France, who have spent their lives in experimental farming for the good of mankind, or Johnson of our own country, who has written those wonderful books entitled "How Plants Grow" and "How Plants Feed"? And who will so effectually win fame as he who shall yet discover some practical method by which that coy constituent, composing ninety per cent. of the atmosphere, shall be wooed into an alliance with other objects, so as to be used in enriching the earth? Whose names more readily occur to us here to-day at this harvest festival, as objects of our gratitude, than Ruffin and Taylor, of your own State, who have left behind them as monuments of their usefulness the examples they set in improving agriculture? Had their admonitions been heeded, Virginia would have been to-day far in advance of her present condition; and while all may not expect to reach the same measure of usefulness, yet there is an opportunity for every one who tills an acre of soil, to aid in bringing about a state of things which will remedy the evils which now exist.

It should be the object of every one, young and old, to co-operate in making Virginia more attractive than it is.

The West, with all its boasted advantages, has no such claims on the favors of the young, nor does she present so many advantages to those seeking new homes; and ye when it is proposed to such that they turn their faces toward this State, they raise two objections which are difficult to answer.

First—That her lands are exhausted, and cannot be resuscitated except at a great expense.

Second—That her roads are neglected, and at times almost impassable.

For these reasons, hundreds of persons who otherwise would seek homes here are turned away.

It is in your power to remedy these things, and in doing so you will not only attract strangers from abroad, but you will make Virginia more attractive to your children at home. There is no more important object than this. Bind your sons to the soil by every means in your power. Overcome, if possible, any desire on their part to leave the country for city life. Let them compare the present condition of the tillers of the soil with that of the tradesman, and they will see that the advantage is largely with the husbandman.

A general wave of commercial disaster has swept over the country, and what wrecks it has left behind! Fortunes which were the accumulations of years of industry have been swallowed up in an hour! Men rich yesterday are poor to-day! But these misfortunes have fallen upon those engaged in trade and commerce, and those who lived upon investments. The tillers of the soil have been affected less by this general disaster than any other class. Land withstands commercial shocks and crises, when everything else gives way; and he who now owns even a poor Virginia farm is envied by the man who but a few years ago was the leader in commercial strife, and thought himself secure against all perturbations of trade. If there ever was a time when young men should pause before leav-

ing the farm, to enter upon that voyage, where out of every one hundred who embark there are ninety-nine wrecks, it is the present.

Though large wealth is not accumulated by cultivation of the earth, yet there are compensating advantages.

Men may cease to trade, but they must and will eat. Bills of exchange may prove valueless, but the garnered harvest will still have a value. The ship may rot in the harbor, but the plow will still turn the furrow. Nature is never bankrupt. Whatever else fails, she will remain solvent. The dews and rains of heaven will ever fall lovingly upon the earth's bosom and the arrows of light descend from the sun's exhaustless quiver. She will never fail to bring forth corn and wine to make glad the heart of man. Thieves may break in and steal bill and bond, but the farm is not the subject of larceny.

Go to the mansion of the rich man even in his days of prosperity and wherein has he the advantage of the farmer? He may point to his polished mahogany, but *he* did not give it that polish and the cabinet-maker has plenty more of the same kind to sell to him who has money to buy. He may point with pride to his stately mansion, but it is too elaborate to be comfortable, and too expensive to be enjoyed. The farmer on the other hand looks upon the fields, that *he* has made beautiful, upon herds that *he* has reared, and upon the golden grain that *he* has garnered. They are the immediate products of *his* toil and not of another's, and therefore give zest to his enjoyment.

The country with all of its hardships and toils is the place for rational enjoyments and all the wealth which the city offers to the most successful enterprise will not repay its loss.

The tendency of city life is to blunt the sensibilities and demoralize the heart. I have seen those who had severed all connection with country life and become so absorbed in schemes for amassing wealth as to lose all capacity to enjoy

the country. In my judgement this is a loss wholly uncompensated by the wealth which they have sacrificed their better natures to accumulate.

I know of such who have acquired in commercial pursuits far more than sufficient for the gratification of actual or fancied wants, and who weary and worn with city cares have returned at the close of life to enjoy the country. But alas ! they found when too late that they had bartered away their capacity to do so. They had never brought an offering to nature's shrine and in return she refused to permit them to participate in the beauties of her laboratory. She withholds from the eyes of such, the beauties of her face, and from their ears the music of her thousand voices. I know of no sadder spectacle than this.

“ He that soweth, shall he not reap ? ”

Such men look upon broad acres only to calculate how much they would cut up for into city lots.

Such persons can never truly enjoy anything. Their ideas of happiness are inseparably connected with wealth and ostentation, and the value of a thing is judged always by what it costs. To such, age brings no repose. Wealth has always been the god of their worship, and when declining years impair the mental and physical powers, the idol becomes the master and rules its slave with a rod of iron. No greater misfortune can befall any man than the accumulation of great wealth without the capacity to enjoy anything beyond the bank account, or the balance sheet.

Such is the penalty often involved in success in great cities, where wealth comes in like a flood, to drown all desires and emotions, except the worship of itself.

On the other hand, what a harmony there is between waning years and the tranquility of rural life, where the objects of existence have not been perverted. If a life has been well spent, age brings with it a desire for quiet and

repose. That can only be found far away from the mart and the forum. The rustic patriarch in some country retreat enjoying a bare competence, who sits under the shade of the tree *his* hand has planted, and admires the green fields, which *his* labor has beautified, is more to be envied than the rich man who measures his rent rolls by the yard, and counts his fortune by millions.

Again, and again, let me urge upon those who despise the farm and are chafing for opportunity to plunge in the whirlpool of city adventure and strife, to profit by the experience of those who have preceeded them in the perilous step. Go not where the eternal hum of busy life ever stuns the ear; where the never ending struggle in social, commercial, and political position engrosses every hour, where the mingled voices of pleasure and pain, hope and despair burden the very air of heaven.

Remain in the country where wants are measured by the capacity for rational enjoyment, and where nature, and not the follies and misfortunes of your fellow men, is your teacher.

Stay where every hour some object of natural beauty, fresh from its Maker's hands, presents itself for your admiration and enjoyment. Grow wiser and better in looking upon the simple violet which makes its toilet of beauty obedient to its Maker's will.

Learn a lesson from the wild Clematis which spreads its folds of snowy gracefulness over the fallen oak—the type of charity in an evil world.

Learn humility and forgiveness from the brook which washes clean the rock, that obstructs its passage, and chants its sweetest music to the pebbles which lie obscure beneath its surface.

Stay where the spirit of life and love moves upon everything you see.

“ The simple flowers are social and benevolent, and he
 “ Who holdeth converse in their language pure,
 “ Shall find Him who Eden's garden drest—
 “ His Maker, there to teach his listening heart.”

Farmers of Virginia you live in a favored land, and have cause for gratitude for the blessings you enjoy.

The whirlwind has not torn the ripened ear from its stalk, nor has the herd sickened in the field.

Great cities seek the fruits of your labors, and make you ample returns therefor.

Your fields are no longer crimson with human blood and made desolate with the tread of contending hosts. Everything around you indicates a growing prosperity.

Here, then, at the close of this annual festival let the incense of grateful hearts rise to the God of the Harvest and the fruitful field.

“ Let His works praise him.”

“ The rolling seasons, as they move,

“ Proclaim His constant care.”

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